

**Term and Conditions 3a**

3. In order to minimize the likelihood of incidental take associated with uncertainty and risk regarding long-term Project effects, the Corps shall implement a monitoring program with the following elements:
    - a. The Corps shall finalize and implement the monitoring program (Table 7-3 of the 2001 BA). All activities related to scope identification, i.e., goals, milestones for completion, and check-in points, triggers for management change (management decision points that include specific metrics), and sampling/testing protocols to be developed, will be coordinated with NMFS. The final monitoring program shall also ensure that adequate pre-, during, and post- construction monitoring actions occur to allow for comparable pre- and post-Project data analysis.
- 

**Monitoring Actions**

MA-1: U.S. Army Corps maintain three hydraulic monitoring stations to measure salinity, water surface and water temperature in the estuary.

MA-2: Report annual dredging volumes.

MA-3: Conduct main channel bathymetric surveys throughout project area.

MA-4: Repeat estuary habitat surveys being conducted by National Marine Fisheries Service, one time 3-years after construction.

MA-5: Annual review any new sediment chemistry from the Lower Columbia River, determine if there are any changes in the “Management Area Ranking” as defined in the DMEF manual.

MA-6: Field surveys will be conducted monthly at selected beaches during outmigration (April-August) to sample the fish being stranded, one year before the deepening and one year after the deepening.

**Schedule:** See specific monitoring action.

**Table 7-3: ESA Sec. 7(a)(2) Monitoring Actions Associated with Dredging and Disposal**

Monitoring Action Number	Indicator	Monitoring Task	Justification	Uncertainty And Risk <sup>1</sup>	Duration	Data Analysis	Trigger For Management Changes
MA-1	Salinity, velocity, water surface, habitat complexity, and connectivity, and conveyance, and habitat opportunity.	The Corps will maintain three hydraulic monitoring stations, one downstream of Astoria, one in Grays Bay, and one in Cathlamet Bay. Parameters measured would include salinity, water surface, and water temperature.	Physical changes related to channel deepening are expected to be small and concentrated near the navigation channel.	Salinity L,L+; velocity L,L; bathymetry L,M-; habitat complexity, connectivity, and conveyance L+, M;	7 years: 2 years before, 2 years during, and 3 years after construction	An analysis would be conducted to determine pre- and post-project relationships among flow, tide, salinity, water surface, and temperature.	Post-project data exceeds defined threshold values. Determine if task should continue and what funding source is appropriate.
MA-2	Dredging volume, bedload.	Annual dredging volumes, construction and O&M.	To ensure scale of the project does not change.	Bedload M, L	Life of the project.	Actual volumes will be compared to predicted.	Dredging volumes exceed capacity of the disposal plan.
MA-3	Accretion/erosion, bathymetry (main channel).	Main channel bathymetric surveys throughout project area.	Side-slope adjustments are expected to occur intermittently adjacent to the navigation channel.	Accretion/erosion M, L; bathymetry L, M-	7 years: 2 years before, 2 years during, and 3 years after construction	Bathymetric changes will be tracked to determine if habitat is altered.	Habitat alteration in main channel due to side-slope adjustment.
MA-4	Tidal marsh, swamp, flats, refugia, habitat complexity, connectivity and conveyance, suspension and deposit feeders, insects, macrodetritus and habitat specific food availability, juvenile salmonids in peripheral habitats and habitat opportunity.	Repeat estuary habitat surveys being conducted by NMFS (Bottom and Gore, 2001 proposal).	Identify if there is a change to habitat due to deepening.	Tidal marsh and swamp habitat M, L+; flats habitat M, M-L+; suspension/deposit feeders M, M; deposit feeders M, M; suspension feeders M, M; insects H, M; macrodetritus H, L+; habitat-specific food availability M, M; feeding habitat opportunity L, L+	One time survey conducted 3 years after completion of the deepening.	Habitat mapping from aerial photos and ground surveys.	Changes to individual habitat types that are based on defined threshold values. Determine need for other surveys.
MA-5	Contaminants	<del>NMFS will review the SEDQUAL database to determine if there are areas that would require additional sampling. Review existing contaminants database using NMFS guidelines or trigger values that are more protective of salmonids and trout. Provide notification during construction dredging</del>	Ensure that channel construction and maintenance does not disturb undetected deposits of fine-grained material, potentially causing redistribution of contaminants that could pose a risk to salmonids and trout.	Contaminants M, M.	<del>NMFS will review SEDQUAL data prior to construction; if additional samples are required they would be obtained prior to construction. On-board observations would be</del>	New sediment samples will be obtained in accordance with the DMEF Manual and Existing sediment data will be reviewed for the amount of fine-grained material. Chemical results will be compared to the	<del>Detection of chemicals at concentrations that pose a risk to the health and/or survival of salmonids or trout. . Any exceedances will be reported to the AMT to determine if consultation should be re-initiated. The Corps, NMFS and USFWS will meet</del>

Monitoring Action Number	Indicator	Monitoring Task	Justification	Uncertainty And Risk <sup>1</sup>	Duration	Data Analysis	Trigger For Management Changes
MA-6	Stranding	<p>to monitor for presence of fine-grained material — i.e., oily sheens. If found, dredging will cease in that location and additional testing will be conducted.</p> <p>The Corps, Fish and Wildlife and NMFS will annually review any new sediment chemistry from the Lower Columbia River and estuary from sources such as SEDQUAL database and, known permit applicants and determine if there are any changes in the "Management Area Ranking" as defined in the DMEF manual</p> <p>Field surveys will be made monthly at selected beaches (upper, mid, and lower river) during the April-August out-migration to measure the number of fish being stranded along beaches.</p>	Identify if there is a change in stranding due to deepening.	Stranding L, M.	<p>conducted. 2 years before, 2 years during construction, and annually during maintenance.</p> <p>One year before deepening and 1 year after deepening.</p>	<p>NMFS guideline for the protection of salmon.</p> <p>Compare pre- and post-project stranding counts.</p>	<p><u>annually or as new circumstances arise to review new data that indicates a changed condition that would trigger the need for additional sediment testing. Changed conditions include events such as spills, new listing of chemicals, changes in guidelines or threshold values, or any other indicator that suggests there is a reason to believe further testing may be required.</u></p> <p>If there is an increase in the number of fish stranded, proposals would be developed and presented to decision makers.</p>